

PATENT SPECIFICATION

424,235

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COMPLETE SPECIFICATION

Improvements in Traps for Insects

I, PAUL BOUTELLIER, of 16, Rue Pasteur, Levallois-Perret (Seine), France, a citizen of the French Republic, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to traps for insects, of the type including a luminous source and suction means for drawing in the insects enticed by the light to a part of the apparatus in which they are trapped.

There are known apparatuses of this type, either with a constant light or with an intermittent light, in which the light rays are emitted directly into the atmosphere, from any source of light for instance an incandescent lamp, a mercury vapour tube, etc.

There are also known insect trapping apparatuses of this kind in which the intensity of the light that is emitted is periodically varied, for instance by periodically cutting off the light from a stationary light source by means of opaque screens turning around said source.

These apparatuses have the disadvantage that the colour of the light that is emitted, whether it is of constant or of variable intensity, is the same for all the points of the surrounding space, without taking into account the well known fact that some insects have a tendency to be attracted more by some colours of light than by others.

Another device of the kind first referred to for removing insects has been proposed, in which a current of air induced by an electrically driven fan is passed horizontally around the source of light, more particularly a lamp emitting ultra-violet rays, the downwardly directed surface of which may be coloured or opaque or have a coloured or opaque shade suspended below it.

The object of the present invention is an improved trap device of the kind first referred to.

The invention consists in a trap for insects of the kind including a luminous

source and suction means, for instance, an electrically driven fan for drawing in insects enticed by the light to a part of the apparatus in which they are trapped, characterised by the fact that in the space surrounding the luminous source there is arranged a cylindrical or polyhedral casing, the lateral walls of which comprise one or more transparent or translucent coloured screens.

Another feature of the invention, which is more especially applicable to the case in which the apparatus includes a light source emitting ultra-violet rays, consists in providing between said source and the orifice through which the insects are drawn in by suction a partition, which may for instance form a reflector, adapted to prevent the air stream thus drawn in from coming into contact with the light source, which might unfavourably influence the working thereof.

A further feature of the invention consists in providing above the light source a plate or body, either transparent or opaque, coated over at least a portion of its surface with a fluorescent or phosphorescent substance. The use of such substances, however, for attracting insects is already known.

Yet another feature of my invention consists in providing the apparatus with means for electrocuting the insects when they come near the apparatus.

Preferred embodiments of the present invention will be hereinafter described with reference to the accompanying drawings, given merely by way of example, and in which:

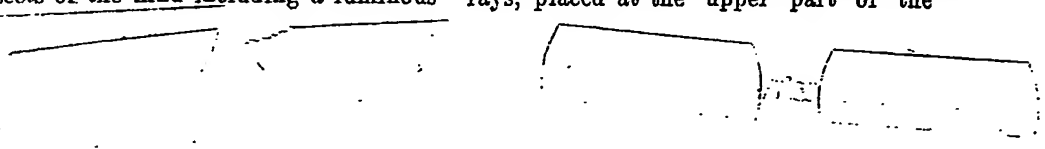
Figure 1 is a vertical sectional view of an apparatus according to the present invention;

Figure 2 is a horizontal sectional view thereof on the line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 1 showing another embodiment of the apparatus according to the present invention;

Figure 4 is a sectional view showing a detail of this apparatus.

The apparatus according to the present invention comprises a light source *a*, for instance, a lamp emitting ultra-violet rays, placed at the upper part of the



apparatus near the inlet of a vessel *b* in which the insects are trapped, being drawn therein by an air stream produced by a fan *c* driven through any suitable means, an electric motor *d* for instance. Vessel *b*, fan *c* and motor *d* are advantageously placed in a box or casing *e* above which is located the luminous source *a*.

10 Around the luminous source there is provided a cylindrical or polyhedral casing, the lateral walls of which are made of a transparent material, such as glass, quartz, mica, celluloid, etc., these
15 faces being coloured so that coloured rays are emitted in the surrounding space. These faces may be all of different colours. The coloured faces may be adjoining or leave between them intervals of any
20 desired width through which the rays emitted by source *a* can pass freely. With such an arrangement there are obtained several zones, through some of which, corresponding to the intervals between
25 the coloured faces of the casing, ultra-violet rays are allowed to pass (assuming that the source of light emits such rays), while through others coloured rays are transmitted depending upon the colours
30 of the screens that are utilised. The faces of this casing may be either fixed in a stationary manner in their support or removably connected thereto so that they may be easily removed and interchanged.
35 Concerning now the choice of the colours, advantage may be taken of the scientific experiments that have been made as to the power of attraction of light of given colour on the insects. It
40 has been found that light yellow, blue and light green are the best colours. Even if it be admitted that the RESS theory according to which the lower forms of animals do not appreciate the shades of
45 the colours and are more or less colour blind, is true, these animals however distinguish colours by their differences of brightness. Besides, among these colours, there may be chosen that or those which
50 are especially suitable for attracting a particular insect or class of insects, such colour or colours being practically indifferent to other insects.

An insect, attracted by the rays of light which are directed not only laterally, through the faces of the casing, but also in an upward direction, from the top of the apparatus, first perceives the variously coloured facets of the above mentioned casing as small surfaces having different
60 colours or at least different brightnesses. As the insect moves toward the apparatus, the effects resulting from irradiation and diffraction increase so that the casing above referred to looks entirely blurred,
65

which dazzles or blinds the insect and greatly facilitates its being drawn into the trap by suction.

Use may be made of transparent or translucent screens that are all of the same colour, this arrangement being utilized chiefly when it is desired to limit the action of the trap to a certain class of insects which are especially attracted by this colour.

In the arrangement shown in Figures 1 and 2, a stationary coloured screen casing is octagonal in shape. The screens are engaged in vertical slides *y* the upper and lower ends of which are respectively connected together by metallic bands *h*¹ and *h*² forming spacing members while the whole is mounted, in a suitable and preferably removable manner, to the stationary parts of the apparatus.

In this example it is supposed that each face of the octagon includes two distinct zones, one of which, of larger area, corresponds to the coloured screen, while the other one, of smaller area, either is not provided with any screen and allows the ultra-violet rays emitted by the lamp *a* to pass freely, or is provided with a substantially opaque screen consisting of blackened glass which cuts off most of the rays emitted by the lamp, or of coloured glass of a colour different from that of the screen covering the first mentioned zone of the face that is being considered.

Screen 1 is of a dark yellow colour, this screen being located adjacent to an interval *X* through which the ultra-violet rays emitted by the lamp are allowed to pass freely. Screen 2 is of a light yellow colour and is located adjacent to a black band *Y*. Screen 3 is of an orange colour and is located adjacent to an interval *X* allowing the ultra-violet rays to pass freely. Screen 4 is red and band *Y* adjacent to it is black. Screen 5 is violet and the space *X* adjacent to it allows the ultra-violet rays to pass freely. Screen 6 is blue and the band *Y* adjacent to it is black. Screen 7 is green and the space *X* adjacent to it allows the ultra-violet rays to pass freely. Finally, screen 8 is of a light green colour and the band *Y* adjacent to it is black.

In the case in which the luminous source is a mercury vapour lamp or another source of light emitting ultra-violet rays, it has been found that the contact of the cold air drawn in by the fan with said lamp can involve some difficulties concerning the working of the lamp, which may be interrupted or disturbed due to the condensation of the

mercury vapours on the constantly cooled walls of the lamp. It has been endeavoured to obviate this drawback by providing the lamp with a double wall, which renders the manufacture thereof complicated and expensive. In order to obviate this drawback and to permit of utilizing an ordinary mercury vapour lamp (therefore a lamp with a single wall), the said lamp is enclosed in a casing which fully protects it from the current of cold air drawn in by the fan. The lateral walls of this casing are then constituted by the transparent or translucent screens above referred to, while the bottom of this casing consists of an opaque partition *i*, which is advantageously so devised as to form a reflector adapted to reflect the rays that strike it either upwardly or laterally. This bottom can then be utilized, in an efficient manner, for supporting the whole of the screens. It may further be so mounted on its support as to be adjustably spaced apart from the inlet or suction orifice *k* of the apparatus, thus permitting to adjust the passage afforded to the inflow of air and to the insects sucked in by said inflow of air.

The whole of the apparatus can be covered by a roof and around the inlet orifice there may be provided an annular basin filled with a liquid such as water or petroleum, in which some of the attracted insects, subjected to the action of the inflowing current of air, are drowned.

There may be also provided, as shown in Figures 1 and 3, above the luminous source, a piece *m*, for instance a bowl or sphere, made of a material that is transparent or opaque and coated, at least partly, on the outside and/or on the inside, with a layer of fluorescent or phosphorescent substance. The rays emitted by the luminous source and those that are reflected in an upward direction by reflector *k* then strike the surface of this piece *m*, and render the latter luminous and visible from a great distance.

Finally, the apparatus may be provided with means for electrocuting the insects attracted by the light. These electrocuting means may for instance, consist of a grid or the like to which current is fed by a circuit which can advantageously be connected in shunt with the feed circuit of the luminous source. Instead of grids, there may be utilized, one or several live blades or plates, disposed across the path of travel of the insects that are drawn in by the fan, for instance, across the inlet of the insect trap.

The apparatus which is partly shown in Figures 3 and 4 and is in accordance

with the above description is completed by means, known per se, for periodically varying the luminous intensity, which may be advantageous in certain cases. In the apparatus shown in Figure 3, use may be made of one or several rotary opaque screens *n* of relatively small width, which are mounted on a support *o* provided on the inside (or the outside) of the transparent casing above described. Support *o* is carried by a spindle *p*, which extends through the bottom of said casing *i*. The spindle carries blades *q* arranged in the path of travel of the air sucked into the apparatus by the motor driven fan *c*, whereby the blades *q* are rotated. The inclination of the blades may be made adjustable. These blades may be provided with one or several slots, which permit of obtaining a more or less considerable braking of the rotary movement of the screen or screens *n*. It is also possible to vary the braking action by means of the arrangement shown in Figure 4, according to which spindle *p* extends through a sleeve *r* mounted on casing *i*. This sleeve is hollow and provided with inner threads permitting to screw therein an annular member *t* capable of being rotated by means of a hexagonal portion *u* readily accessible from the outside. A ring *s* made of a flexible and elastic material is interposed between the end portion of the sleeve *r* and a flange *w*. This ring *s* may, for instance, be made of hard rubber or leather. With such an arrangement it is possible to obtain a variable flattening of ring *s* and consequently a suitable braking of spindle *p* and therefore of the movement of rotary screens *n*.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A trap for insects of the kind including a luminous source and suction means, for instance, an electrically driven fan for drawing in insects enticed by the light to a part of the apparatus in which they are trapped, characterised by the fact that in the space surrounding the luminous source there is arranged a cylindrical or polyhedral casing, the lateral walls of which comprise one or more transparent or translucent coloured screens.

2. A trap for insects according to Claim 1, characterised in that the lateral walls of the cylindrical or polyhedral casing also comprise at least one opaque screen.

3. A trap for insects according to Claim 2, characterised in that the coloured

transparent screens and the opaque screens are mounted in a removable manner on the casing that supports them.

4. A trap for insects according to
5 Claims 1 to 3, characterised by free intervals left between the screens so as to allow the light rays emitted by the light source whatever their wave-length, to pass through said intervals.

10 5. A trap for insects according to Claim 3 or 4, characterised by the fact that it comprises one or several opaque rotary screens, disposed on the inside or the outside of the cylindrical or polyhedral
15 casing, so as to periodically vary by occultation the luminous intensity observed at any point of the surrounding space.

6. A trap for insects according to any
20 of the preceding claims, characterised in that there is provided, between said source and the orifice through which suction takes place, a partition forming,

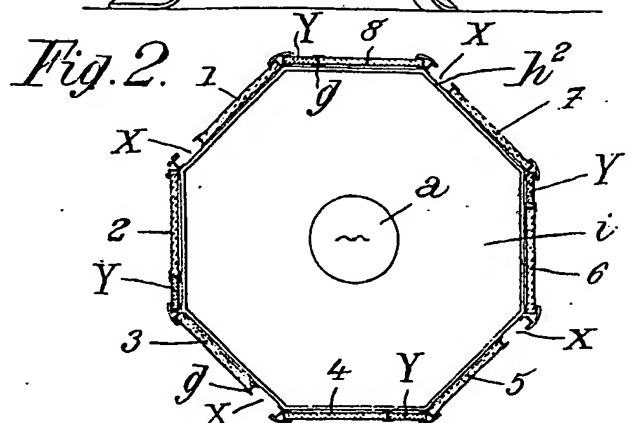
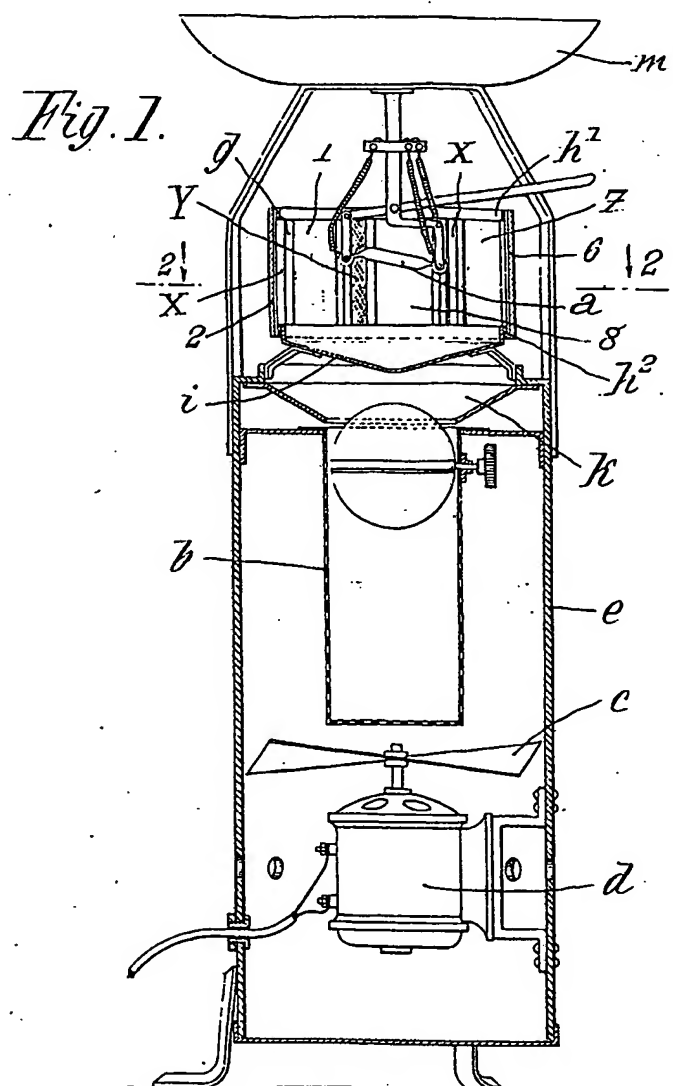
for instance, a reflector and adapted to prevent the current of air sucked in
25 through the apparatus from coming into contact with the luminous source, which might perturb the working thereof.

7. A trap for insects according to any of the preceding claims, characterised by
30 the provision, above the luminous source, of a piece of transparent or opaque material coated, at least on a part of its surface, with a fluorescent or phosphorescent substance.
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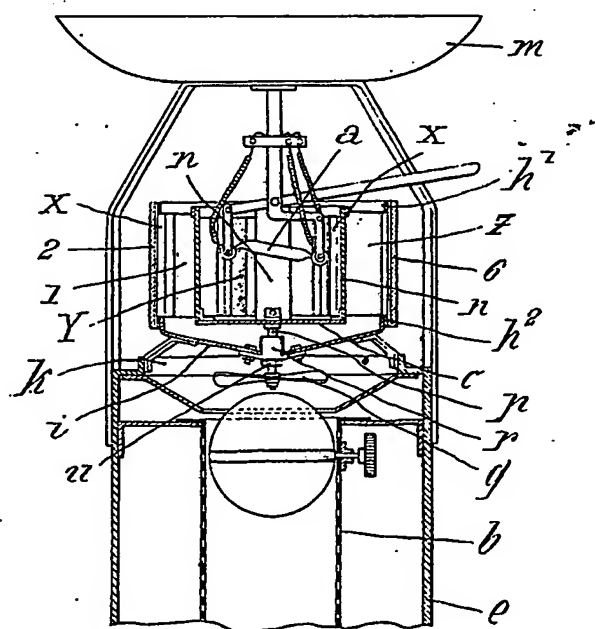
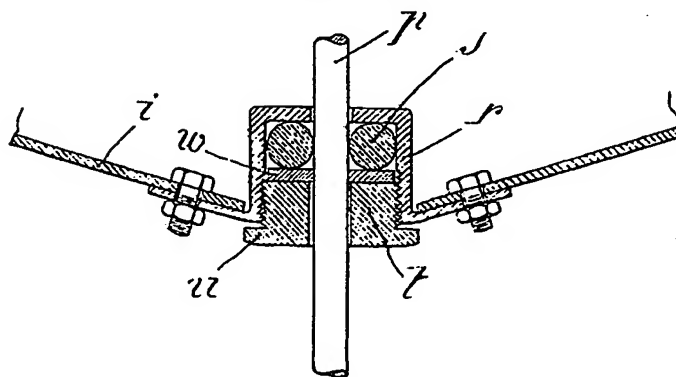
8. A trap for insects according to any of the preceding claims, characterised by the fact that it comprises means for electrocuting the insects when they come
40 close to the apparatus.

9. The improved insect traps, substantially as hereinbefore described and shown in the accompanying drawings.

Dated this 9th day of February, 1934.
MARKS & CLERK.



[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 3.*Fig. 4.*

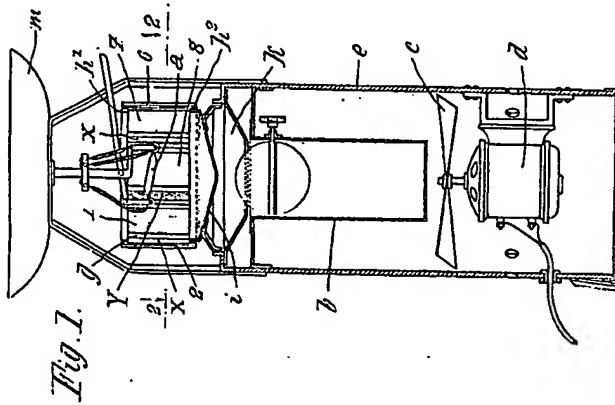


Fig. 1.

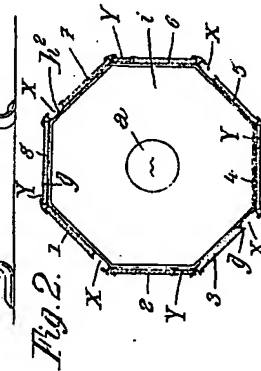


Fig. 2.

Fig. 3.

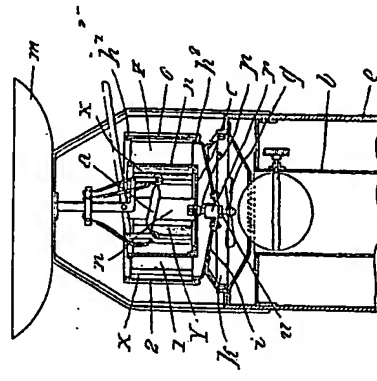
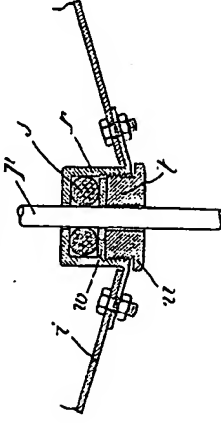


Fig. 4.



[This Drawing is a reproduction of the Original on a reduced scale.]